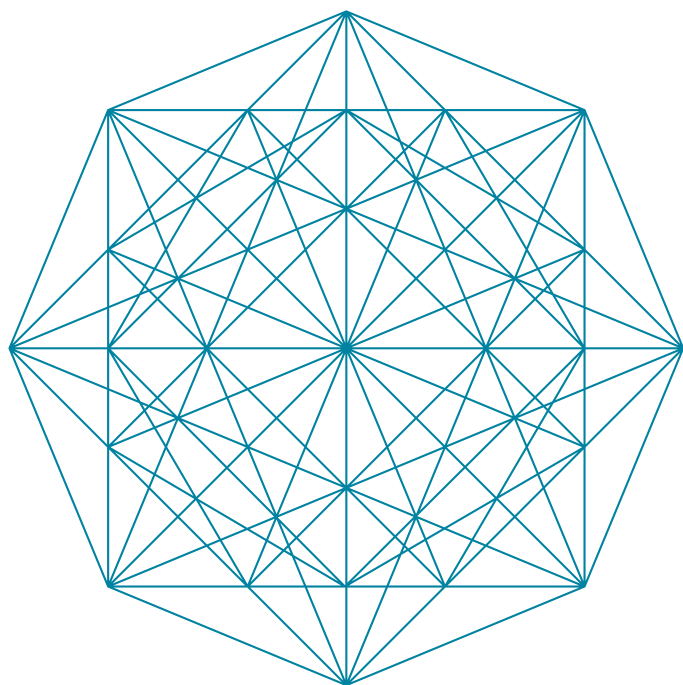




Create  
new  
world



**BETTERING**  
**WORLD** *through*

Q U A L I T Y F O R M W O R K

Using world-changing initiatives, we're out to create a new future.

Our legacy and success are only fueled by our passion to change the world.

With limitless passion, GS E&C moves beyond being Korea's best to create change around the world.

Incorporating green and smart technology into everything it produces, GS E&C is a top-tier global leader, spearheading sustainable growth with future-oriented technology and products.

From its start in 1969, the company has continued to grow and innovate, seeing astounding success around the world.

Building its presence in Vietnam, GS E&C soars again, bringing fresh initiative to each sector of its expertise.

GS Aluminium formwork systems are designed in compliance with the highest safety standards to be easily integrated with any type of the site, its easy handling and assembly and the quality of the materials used.

## Financial Highlights

as of Dec 31, 2018 (UNIT 100MIL WON)



1970s

**1969**  
- Lackhee Development Co. (LDC) incorporated.

**1977**  
- Lucky International Construction Co. created.

**1988**  
- Start of construction of the Lucky Goldstar  
- North America Headquarters.  
- Completion of the Imam University Sports Center.  
- Company moves to Yeokjeon Building.

1990s

**1995**  
- COMPANY NAME CHANGED TO LG CONSTRUCTION.

**1999**  
- LG CONSTRUCTION AND LG ENGINEERING MERGE.

2000s

**2003**  
- Chosen as "Best Corporate Management Structure" by the Korea Stock Exchange.  
- 'Xi' chosen as the No. 1 brand in the 2004 Consumer Well-Being Awards.

**2005**  
- CORPORATE NAME CHANGED TO "GS ENGINEERING & CONSTRUCTION CORP."  
- Awarded the "Silver Tower Award" for the restoration of the Cheonggyecheon.

**2006**  
- Named world's 31st largest construction company out of 225 companies in 2006 by ENR magazine.

**2007**  
- NAMED WORLD'S 31ST LARGEST CONSTRUCTION COMPANY OUT OF 225 COMPANIES IN 2007 BY ENR MAGAZINE.  
- GSND ESTABLISHED IN VIETNAM

**2008**  
- Xi comes 1st in apartment category for 3 straight years in 2008 First Brand Grand Prize.

2010s

**2011**  
- GS E&C admitted into Dow Jones Sustainability Index in two straight years.

**2013**  
- Honored with the 1st Government Citation for Korea's Endeared Firm.

**2015**  
- Named the 26th largest contractor out of top 250 global construction companies in 2015 by ENR magazine

**2019**  
- RENAMED GSND TO VGSI  
- OFFICIAL LAUNCH OF THREE NEW VGSI-BACKED BUSINESSES: ALUMINIUM FORMWORK / PHC PILE / ELEVATORS

*Bringing*

**STRONGER,  
SLEEKER  
FORMWORK**

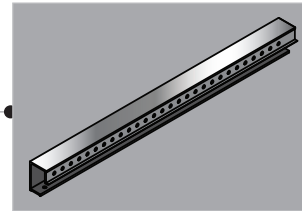
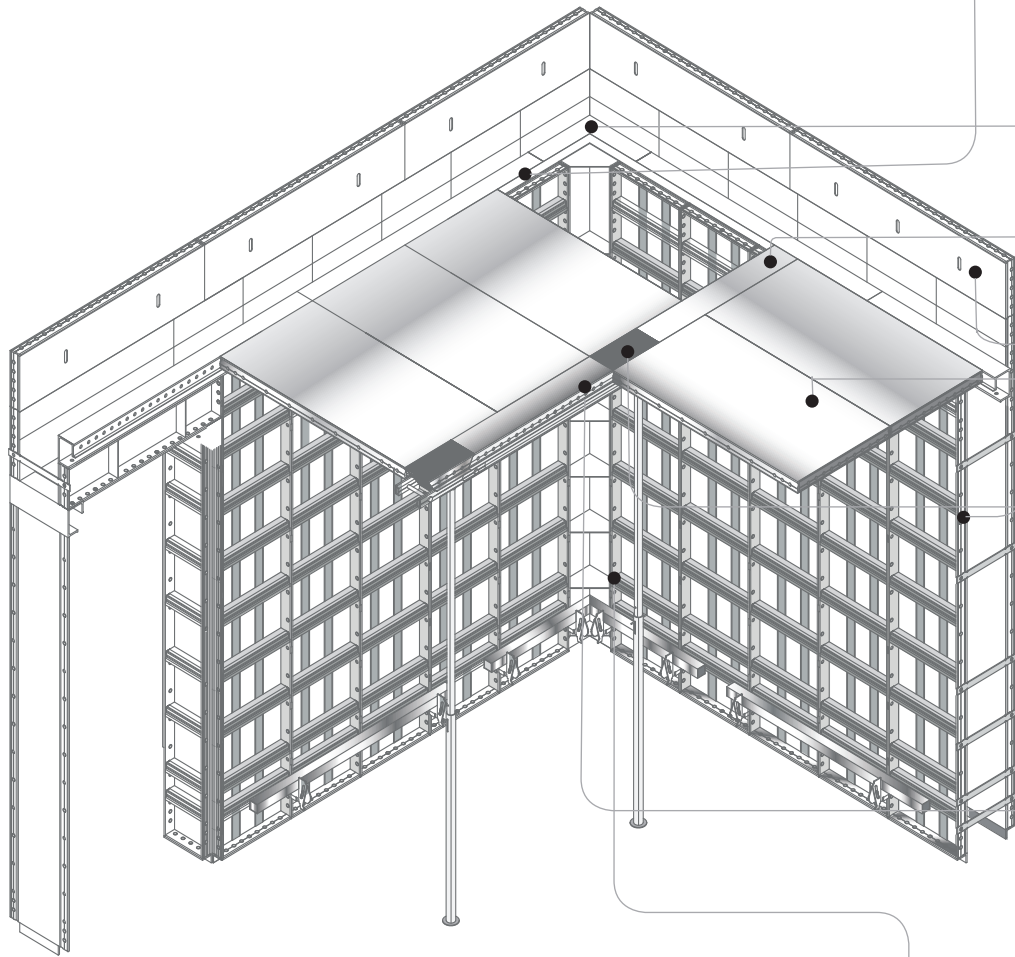
*to* W O R L D



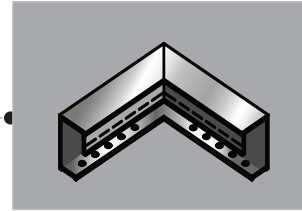
# ALUMINIUM FORMWORK

Aluminium formwork is a construction system for forming the cast-in-place concrete structure of a building. It is an efficient approach which yields remarkably strong structures with supreme concrete finish.

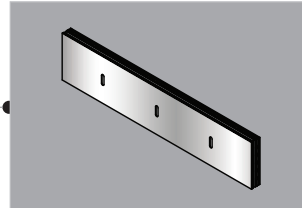
We focus on providing more developed formwork system in the world.



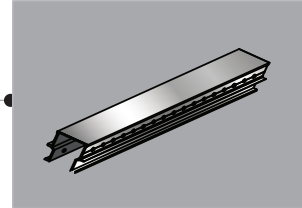
**Slab Length:** 150 \* 1800



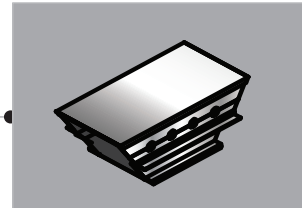
**Slab In-corner:** (400+400)\*150



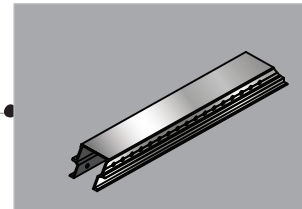
**Kicker:** 1800 mm



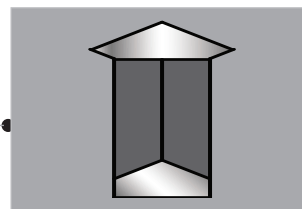
**End beam:** 150\*900



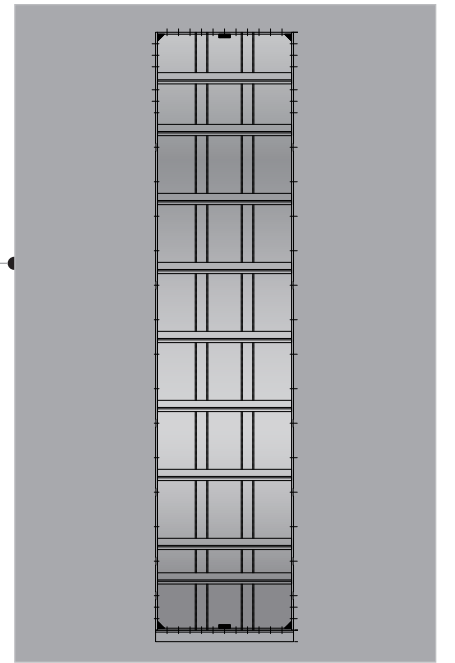
**Standard Prop Head (W x L):**  
150 \* 300



**Standard Middle Beam (W x L):**  
150 \* 900



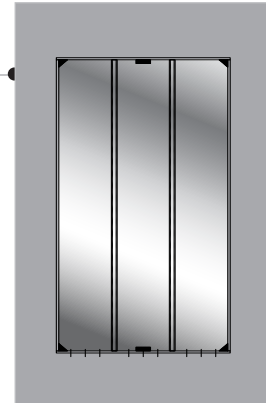
**In-corner:**  
(100+100)\*2600/2400  
(100+150)\*2600/2400  
(150+150)\*2600/2400



**Standard Wall Panel (W x H) (Including Rocker):**

450 \* 2650, 400 \* 2650  
350 \* 2650, 300 \* 2650  
250 \* 2650, 200 \* 2650

450 \* 2450, 400 \* 2450  
350 \* 2450, 300 \* 2450  
250 \* 2450, 200 \* 2450



**Standard Slab Panel (W x L):**

600 \* 1200, 600 \* 900,  
400 \* 1200, 300 \* 1200

# Aluminium Formwork VCSI setting process

01 Delivery to the site



02 Marking



03 Checking the mark



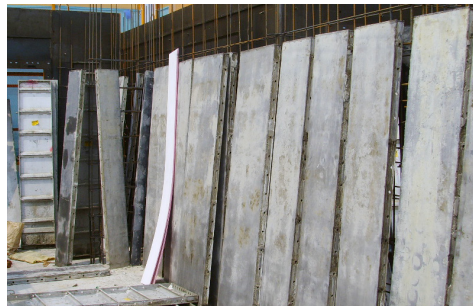
04 Rebar works for wall



05 Checking rebar works



06 Setting and oiling wall panels



07 Setting wall panels



08 Setting S/L and beam panels



09 Setting slab beams



10 Setting slab panel



11 Setting slab panels



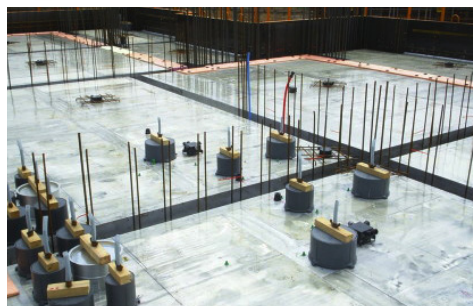
12 Setting staircase panels



13 Numbering panels



14 Oiling



15 Rebar works for slab



16 Mechanical and Electrical



17 Concrete Casting



18 Concrete Casting



19 Dismantling panels



20 Finishing dismantle



*1* Improves wall  
panel strength

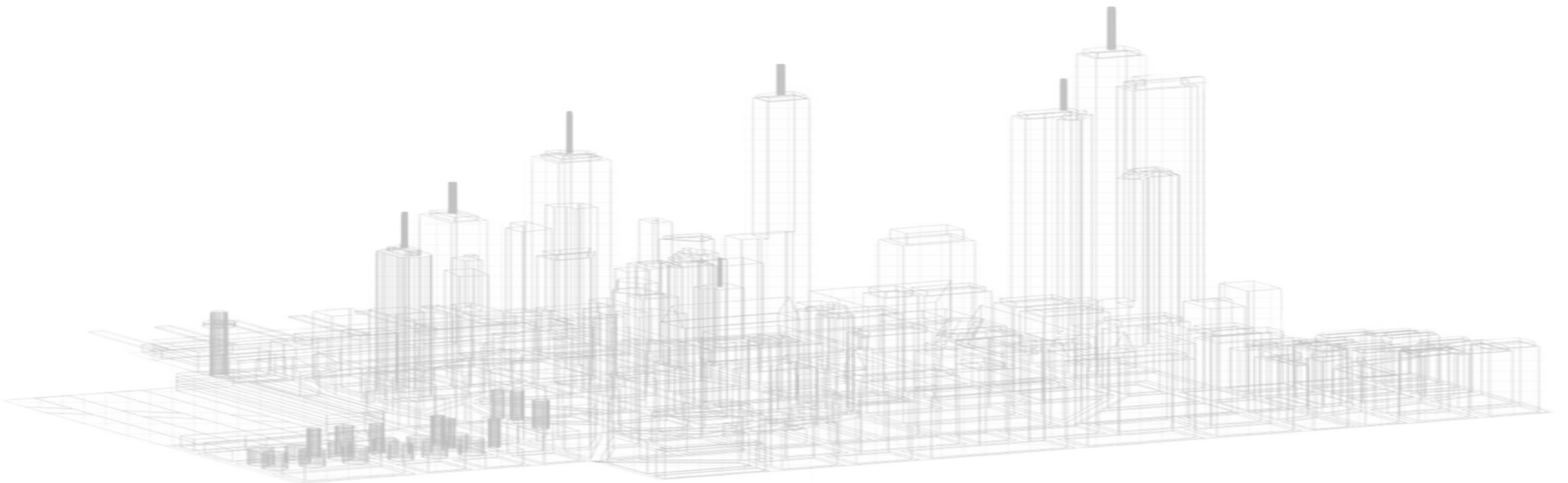
*2* Makes slab panels  
more stable

*3* Increases wall  
panel height

*4* Improves horizontal  
stiffener

*How is*  
**OUR  
PRODUCT**

**I M P R O V E D**

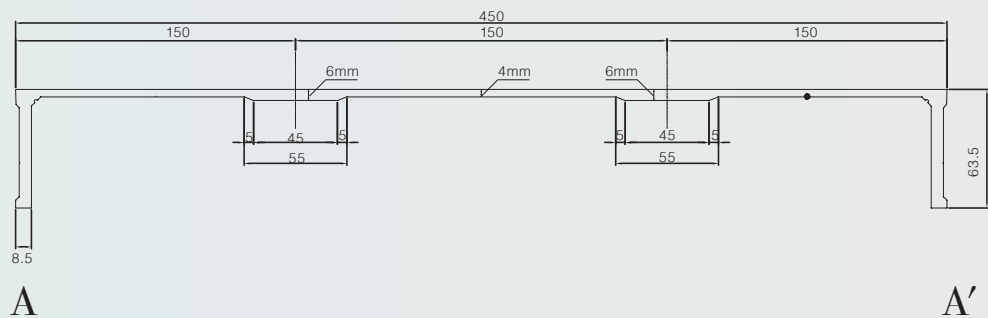
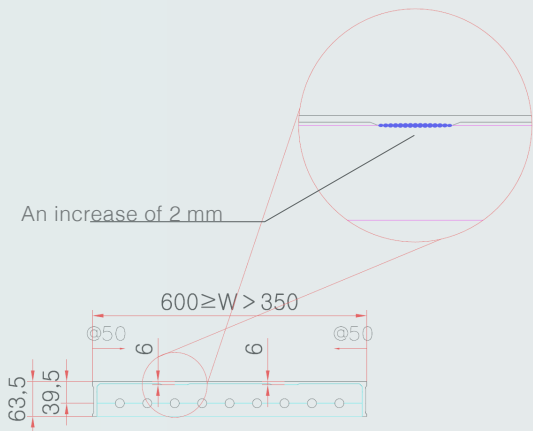
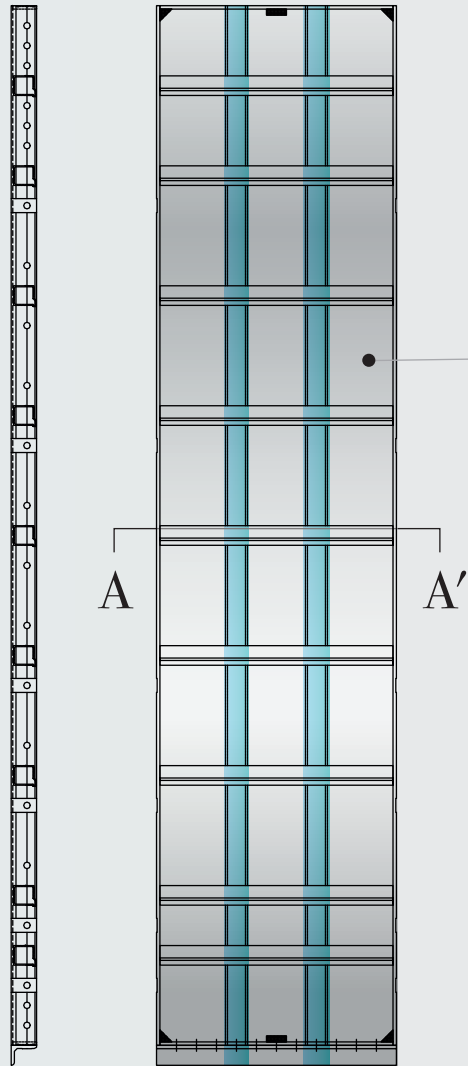
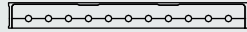


# 1

## Key points

- Increases panel thickness which is welding point
- Prevents damage caused by welding
- Adds structure and supports concrete

$$450 \geq W \geq 200$$



# Improves Wall Panel Strength

## VGSI Wall panel details:

In order to prevent panel damages caused by welding and strengthen panel stiffeners, We increase panel thickness at welding points to 6 mm.



## Statics Calculation Simulation

### VGSI:

There is slight deformation on the surface of Aluminium form

### Structural Design Summary

1. Form size = 500mm x 2600mm  
Floor height = 3500mm
2. Design Method  
- Allowable stress design
3. Material (A6061-T6)  
- By Temporary Works standard spec.:  
Fb = 125MPa/Fv = 72.2MPa/E = 70000MPa
4. Design load calculation  
Lateral pressure = 50.03 kN/m<sup>2</sup>  
= 0.05003 N/mm<sup>2</sup>

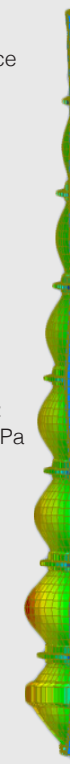


### Other products:

There is a substantial deformation on the surface of Aluminium form

### Structural Design Summary

1. Form size = 500mm x 2600mm  
Floor height = 3500mm
2. Design Method  
- Allowable stress design
3. Material (A6061-T6)  
- By Temporary Works standard spec.:  
Fb = 125MPa/Fv = 72.2MPa/E = 70000MPa
4. Design load calculation  
Lateral pressure = 50.03 kN/m<sup>2</sup>  
= 0.05003 N/mm<sup>2</sup>



### \*Damages on the surface:

The damages on the surface of Aluminium panels caused by welding, can be seen clearly. To prevent this damage on our Aluminium panel surfaces, panel thickness is increased up to 6 mm at welding points.



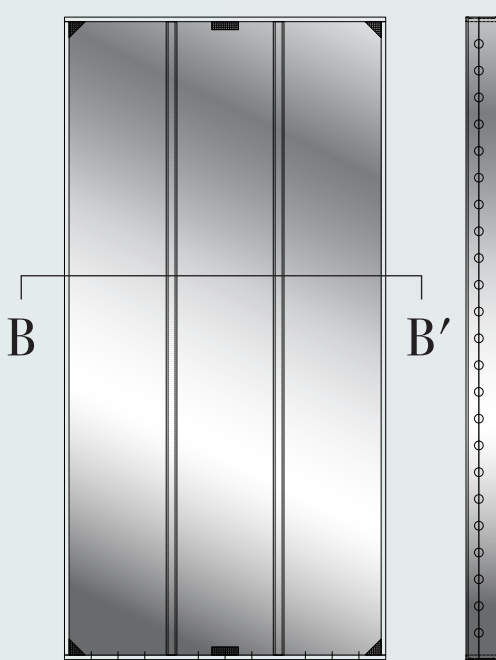


# Key points

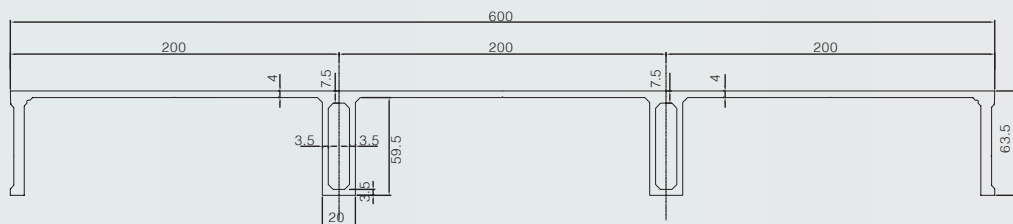
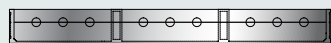
- Improves rigidity for stability
- Changes direction of reinforcement to complement compressive stress

## VGSI slab panel detail:

Changes direction of stiffener to complement compressive stress.



\*Real image



B

B'

# Stability of slab panels

## Statics calculation Simulation

### VGSI:

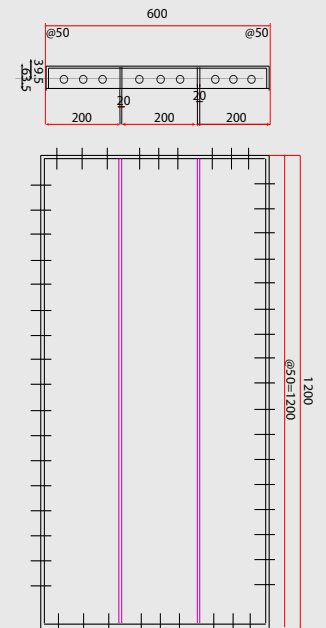
There is slight deformation on the surface of Aluminium form

### Structural Design Summary

1. Form size = 600mm x 1200mm  
Slab thickness = 200mm
2. Design Method  
- Allowable stress design
3. Material (A6061-T6)  
- By Temporary Works standard spec.:  
Fb = 125MPa/Fv = 72.2MPa/E = 70000MPa
4. Design load calculation  
- Dead Loads: Slab 24000 N/m<sup>3</sup>x200mm = 4800 N/m<sup>2</sup>  
Form = 400 N/m<sup>2</sup>  
- Live Loads: = 2500 N/m<sup>2</sup>  
- Total Loads: = 7700 N/m<sup>2</sup>  

---

= 0.0077 N/mm<sup>2</sup>



### Other products:

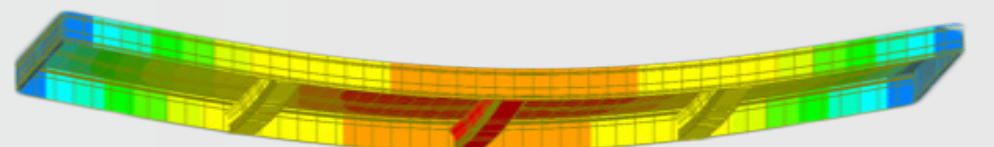
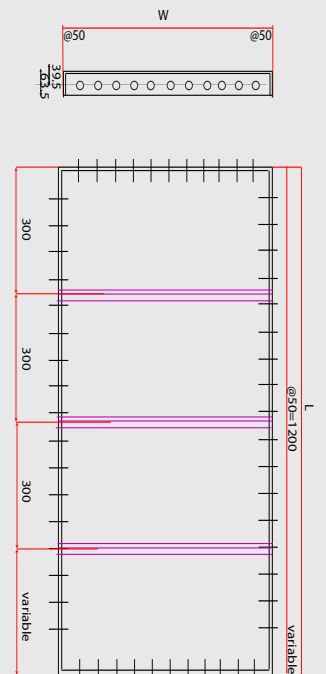
There is a substantial deformation on the surface of Aluminium form

### Structural Design Summary

1. Form size = 600mm x 1200mm  
Slab thickness = 200mm
2. Design Method  
- Allowable stress design
3. Material (A6061-T6)  
- By Temporary Works standard spec.:  
Fb = 125MPa/Fv = 72.2MPa/E = 70000MPa
4. Design load calculation  
- Dead Loads: Slab 24000 N/m<sup>3</sup>x200mm = 4800 N/m<sup>2</sup>  
Form = 400 N/m<sup>2</sup>  
- Live Loads: = 2500 N/m<sup>2</sup>  
- Total Loads: = 7700 N/m<sup>2</sup>  

---

= 0.0077 N/mm<sup>2</sup>

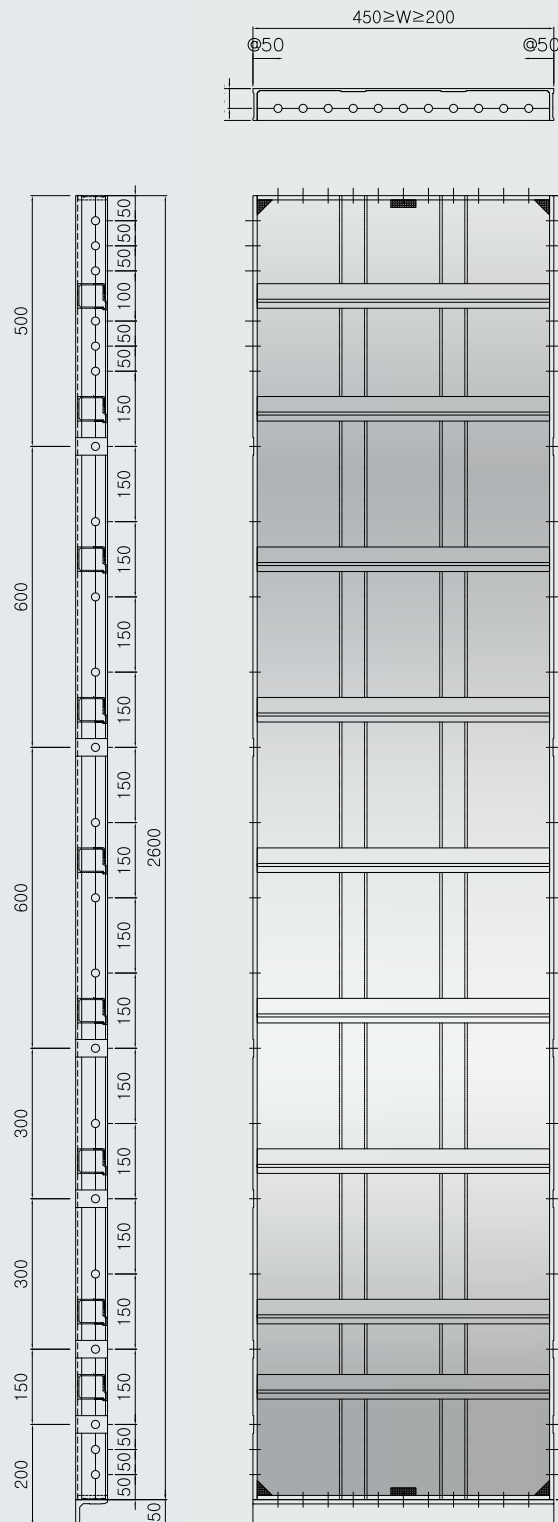


# 3

## Key points

- Added height to 2,600mm
- Allows for reduced upper panel size

# Increases wall panel height



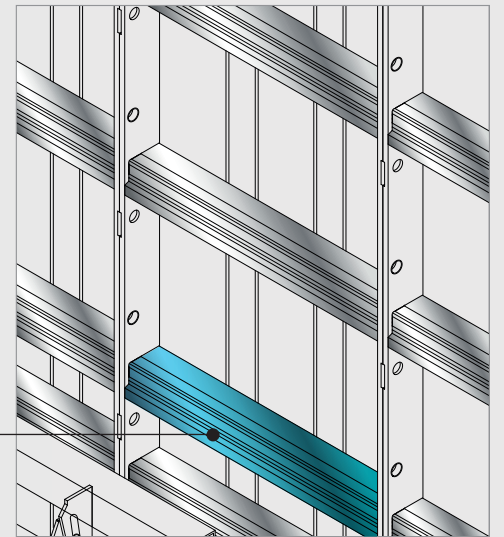
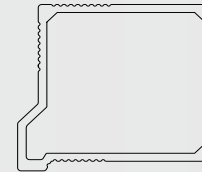
# 4

## Key points

- Changes shape of horizontal stiffener
- Adds corner compensation reinforcement

# Improves horizontal stiffener

## Change of the shape of stiffener



## VGSI product



### \*Section detail:

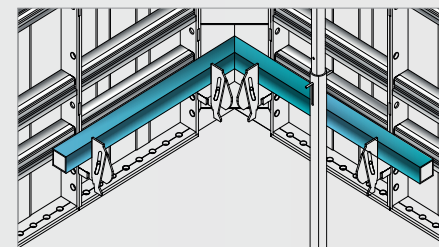
- Horizontal stiffener is modified in order to align with panel end profile (63.5mm)
- Steel box is placed with horizontal stiffener.

## Other product



### \*Section detail:

- Horizontal stiffener does not align with the panel end profile.
- Steel box does not align with horizontal stiffener.



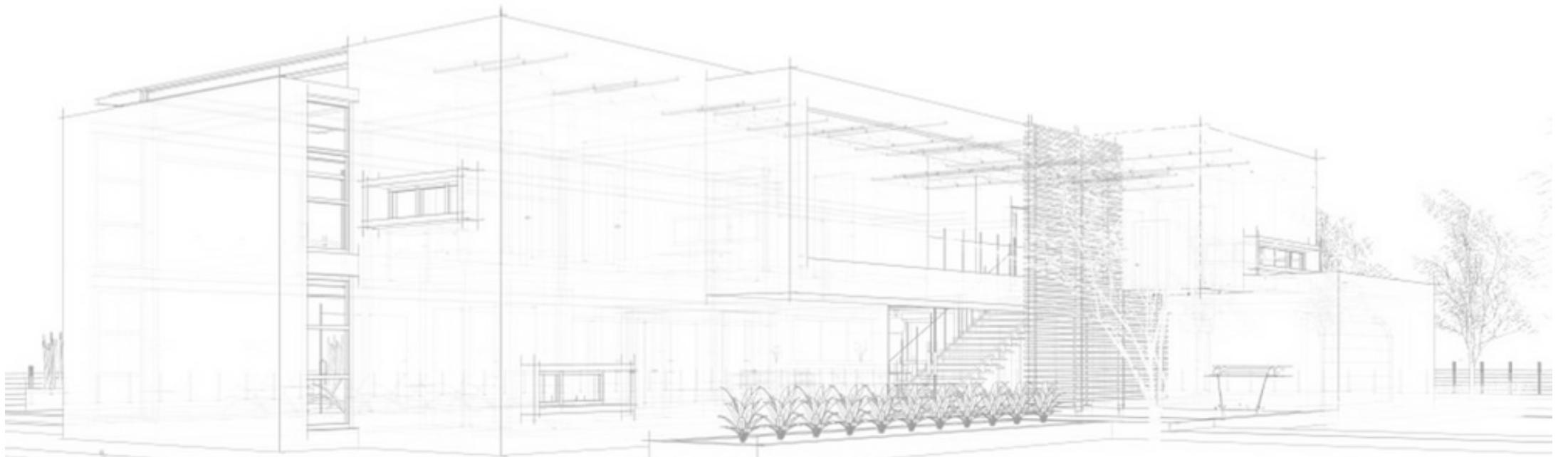
### \*Tips:

- Adding corner compensation stiffener
- We suggest an additional stiffener to reinforce the strength of the corner

- 1 **Quality** – We deliver the highest and best quality products.
- 2 **Speed** – Our automatic systems give us an advantage over others in the market.
- 3 **Capacity** – We have an overwhelming and impressive production capacity.
- 4 **Service** – We have the most hands-on and knowledgeable technical and support teams.

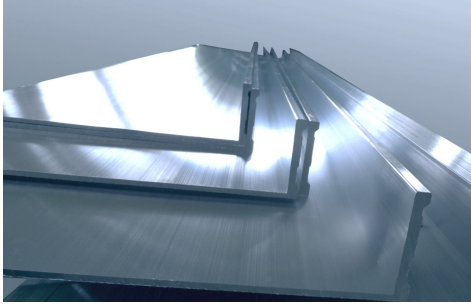
*How is*

# OUR FACTORY

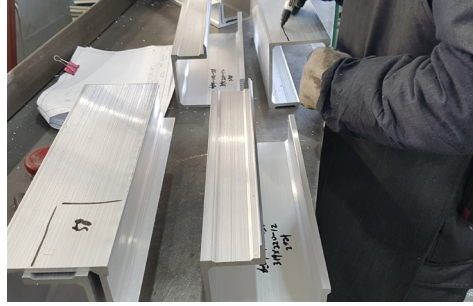


## Manufacturing process for new products

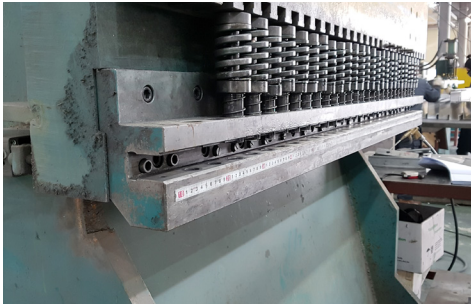
01 Aluminium Alloy (Raw material)



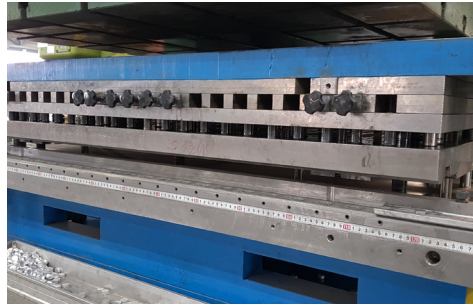
02 Marking and Cutting



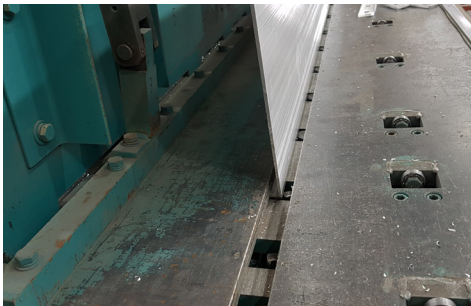
03 Punching (3000)



04 Punching (1000)



05 Noching



06 Robot welding



07 Coating



08 Drying



09 Attaching Barcode



10 Packing and Stand by



## Manufacturing process for used products

01 Return to the factory



02 Classifying Scrap



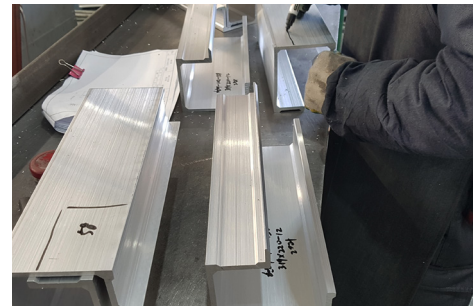
03 Cleaning by worker



04 Cleaning by machine



05 Marking and Cutting



06 Robot welding



07 Coating



08 Drying



09 Attaching Barcode



10 Packing and Stand by



# VGSI

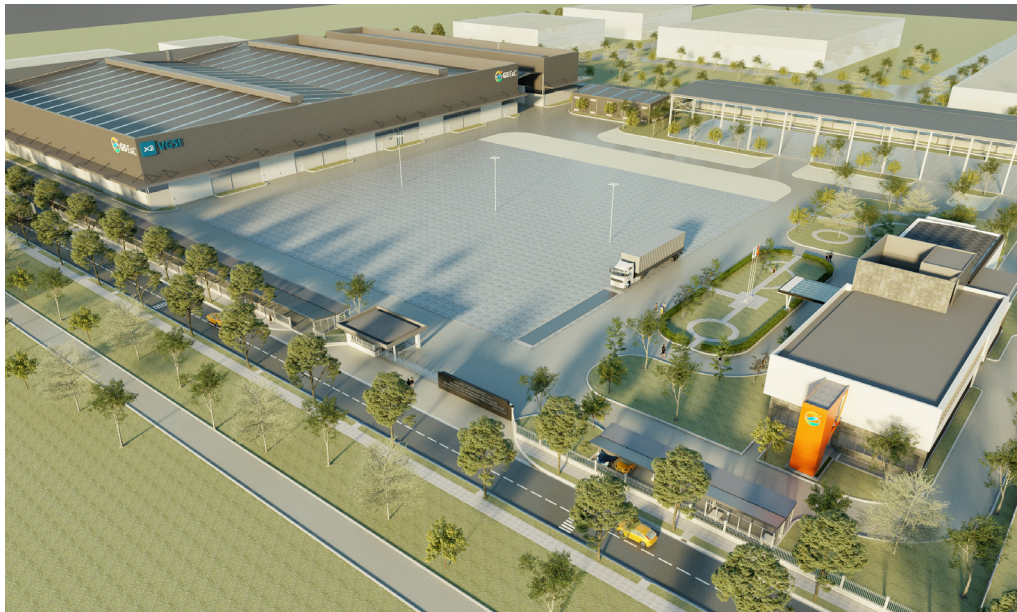
## ALUMINIUM

### FORM *factory*

Located in Nhon Trach 6 Industrial Park, Dong Nai Province, Vietnam, our Aluminium Form Factory is state-of-the-art.

GS manufactory has got design capability 1.000 tons. Products per month.

GS aluminium formwork manufactory specialized in manufacturing high-quality products meet ASTM.



*Factory bird's eyes-view*



*Factory Front*



**Land area:** 55,000 m<sup>2</sup>  
**Total floor area:** 27,674.54 m<sup>2</sup>  
**Building area:** 22,992.52 m<sup>2</sup>  
**Building coverage ratio:** 41,80 m<sup>2</sup>

**Construction area:**

- Main factory: 17,467.80 m<sup>2</sup>
- Steel factory: 3,035.00 m<sup>2</sup>
- 2nd factory: 600.00 m<sup>2</sup>
- Raw material stock yard: 3,150.00 m<sup>2</sup>
- Office: 2,281.74 m<sup>2</sup>
- Motorbike parking lot: 924.00 m<sup>2</sup>
- Et cetera: 216.00 m<sup>2</sup>

*Factory Office Front*



*Factory bird's eyes-view*



*Main Gate*

# GS E&C A GLOBAL PARTNER

## Contact

10 Luong Dinh Cua St.,  
An Khanh Ward, District 2, HCMC  
Phone: [84-28] 3740 2181~2

## Factory address

VGSI AL-Form factory, Nhon Trach 6 Industrial  
Park, Long Tho commune,  
Nhon Trach district, Dong Nai province

Taking on any challenge and never giving up until the job is done, we approach the future without fear.

We create new, exciting products while broadening and bettering the world with fervor and passion.

Creating new value in life and dreaming of a better future for our customers.

# 20

countries of  
the world

# 24

overseas  
companies or  
branches

# 207

project sites



*Ready for an*  
**EXCITING**  
*new start*

# Global Technology Leader

Changing the world with its incomparable technology  
GS E&C and VGSi lead to a vibrant future through endless technology innovation

Green Technology  
Smart Technology  
Advanced Technology



# ALUMINIUM FORMWORK

Business Card Slot